Volume 109
Article 02

STATEWIDE FISH STOCKING PROGRAM
PUT-GROW-AND-TAKE
F-81-D-7

IDFG 97-30
October 1997

STATEWIDE FISH STOCKING PROGRAM
PUT-GROW-AND-TAKE
F-81-D-7

INTRODUCTION

This report is to meet the compliance standards for the Sport Fish Restoration Grant F-81-D-7 to enhance sportfishing statewide. This report is a compilation of the three hatcheries' annual reports and parts of the Upper Snake Region annual report for the calendar year 1996.

These hatchery programs have produced a very large number of fishes for the anglers of Idaho. A total of nearly 20 million fish and eggs were produced during 1996 at these hatcheries. The different species raised included three strains of kokanee salmon, two strains of cutthroat trout, and many strains of rainbow trout, brook trout, and brown trout.

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CABINET GORGE FISH HATCHERY

1996

Bradford W. Dredge, Fish Hatchery Manager I
Bruce Thompson, Assistant Fish Hatchery Manager

INTRODUCTION

Cabinet Gorge Hatchery is located on the south bank of the Clark Fork River in Bonner County, Idaho approximately eight miles southeast of the community of Clark Fork. The hatchery was constructed in 1985 and was co-funded by Washington Water Power (WWP), Bonneville Power Administration (BPA), and Idaho Department of Fish and Game (IDFG). The hatchery is operated by IDFG. The primary purpose for Cabinet Gorge Hatchery is to produce late-spawning kokanee salmon *Oncorhynchus nerka kennerlyi* fry for release into Idaho's Lake Pend Oreille. Kokanee fry are needed to mitigate for the loss of wild kokanee recruitment caused by hydroelectric power projects in the Pend Oreille watershed. The kokanee fry release is timed to coincide with cycles of zooplankton blooms.

The hatchery is staffed with two permanent employees. Thirty-three months of temporary labor are available for use during the year. Housing accommodations include two residences for the permanent staff and crew quarters for two temporary employees.

Water Supply

Cabinet Gorge Dam is located about one mile upstream from the hatchery. After its completion in 1952, artesian springs began appearing along the Clark Fork River at the present site of the hatchery. The hatchery water supply consists of approximately 4.4 cubic feet per second (cfs) from a spring and approximately 20 cfs from a well field. The temperatures of the lower spring and upper well field vary inversely with each other over a 12-month period. The cooler water from the lower springs (pumps #7 and #8) was utilized to incubate eggs until December 15, 1995. At that time, a mixture of the two water sources allowed incubation and feed training water to be kept around 50°F (range 45.8°F to 50.4°F). Production water ranged from 38.8°F to 49.5°F.

The hatchery utilizes six pumps to move the water to a common headbox. The lower spring and upper well field water serves the 31,000 cubic feet of rearing space in the hatchery building and the 1,500 cubic feet of space in the adult holding ponds.

Rearing Facilities

CABGORGE

Rearing facilities at the hatchery include 192 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with a maximum capacity of 110,000 kokanee eggs each. The 64 concrete raceways have a rearing space of 31,000 cubic feet. Approximately one-third of each raceway is enclosed by the hatchery building. The adult kokanee holding area consists of two holding ponds (10 ft x 30 ft each) at the head of the fish ladder. Additional adult holding is available in three holding ponds (10 ft x 30 ft each).

PRODUCTION

Between January 1, 1996 and December 31, 1996, Cabinet Gorge Hatchery produced a total of 12,330,698 fish weighing 36,924 pounds (Appendix 1). On January 3, 1997, a total of 4,051,111 Lake Pend Oreille kokanee eggs and newly-hatched fry were on hand (Appendix 2).

A total of 34,312 pounds of feed produced 34,637 pounds of gain for an overall feed conversion of .99. Total production cost (less capital outlay) was $218,881, resulting in a cost per pound of fish of $5.93, cost per inch of fish of $0.0083, and $17.75 per thousand fish (Appendix 1).

Lake Pend Oreille Kokanee

General Rearing

Fertilized eggs were brought to the hatchery building and disinfected in 100 ppm Argentyne for 15 minutes. After enumeration by volumetric displacement, the green eggs were placed into upwelling incubators and gently rolled until eye-up. At eye-up the majority of the eggs were sorted and counted with the Jensorter JHC-1 14 model sorter. The remaining eggs were not handled and were allowed to incubate until 1,200 thermal units (TU's) had accumulated. At 1,200 TU's, the sac fry were sorted in an attempt to determine the cause of premature hatch in the upwelling incubators. Swim-up fry were allowed to swim out of the incubators into the raceways at 1,670 to 1,690 temperature units. Feed training began at 1,690 to 1,710 temperature units.

Kokanee were feed-trained at approximately 50 °F using Rangen's Soft-Moist Starter and, following feed contract changes, 1/32-in pellet or Rangen's Trout and Salmon Starter #1. After this initial feed training, the fish were reared on Rangen's

Soft-Moist 1/32-in and Rangen's Trout and Salmon Starter #1 and #2 depending on fish release size objectives. These size objectives have changed from about 1.3 fry inches (1986) when the hatchery began operations to the present request of 2 inches at release. To meet this request, the hatchery capacity has been reduced from 30 million to 16 million fry.

Egg collection lasts over two months, and a cross-section of the run is required for each release strategy. Growth rates were not manipulated during the 1996 rearing season to achieve a universally sized 2-inch fry. The fish were reared using 42 monthly temperature units per inch of growth. For the second consecutive season, fish were not starved or overfed to attain the average 2-inch size parameter at release. After approximately 6 weeks of feed training, the fry were extended in the raceway, and water temperatures were lowered to emulate natural production in Lake Pend Oreille.

A total of 10,845,304 kokanee fry were produced at an average length of 2.16 inches and an average weight of 331.24 fish per pound. These fish gained 30,834 pounds from 30,132 pounds of feed, resulting in a conversion rate of 0.98:1.0. Fish feed production cost was $5.87 per pound, $0.0082 per inch, and $17.72 per thousand.

Survival of green eggs to feeding fry was estimated at 88.2% (1995, 90.0%). Survival from first feeding to release was estimated at 98.0% (1995, 96.1%), resulting in survival from green egg to release of 85.5% (1995, 86.4%).

Fish Marking

No fish were marked this year due to lack of funding.

Fish Liberations

On July 15, 1996, 4,349,686 fish were released from the Cabinet Gorge Hatchery into the Clark Fork River. On June 18-19, 1996, 4,520,724 kokanee fry were released into Sullivan Springs. On June 20, 1996, 1,278,340 kokanee fry were released along the north shore of Lake Pend Oreille. Lucky Peak Reservoir received 184,301 fry and Spring Creek received 512,253 fry.

Numbers at release were based upon Jensorter counter/sorter inventory numbers at eye-up minus mortality and on inventory weights of fry sorted raceways prior to release. All fish were off feed for three full days before inventory pound counts were

taken. Pound counts were completed on all raceways one to three days prior to fish being loaded onto the transport vehicles or being released into the Clark Fork River. All raceways were displaced onto the transport trucks during the Sullivan Springs release to double check inventory numbers. All raceways were displaced onto the transport trucks during the Lake Pend Oreille north shore release to check against inventory numbers. Weight displacements were performed to support current fish inventory numbers on hand at the time of release. No weight displacements were conducted prior to releasing the fish into the Clark Fork River via the fish bypass system. A few of the Clark Fork River raceways were inventoried prior to release during the rearing season.

The Clark Fork River release group were liberated at night directly into the ladder via the fish bypass system. Only three raceways were released at one time. The entire release took less than two hours.

To facilitate rapid outmigration, the Cabinet Gorge Dam (WWP) cooperated by providing flushing water flows of 38,000 cfs during the release and for eight hours thereafter.

The Sullivan Springs release group was transported in IDFG tankers (3,000-gallon capacity). Loading densities of small fish in the tankers was kept below 0.60 pounds per gallon. Fish were planted below the bridge on the access road to the IDFG patrol cabin. Two tankers made eight releases during the period of June 18-19, 1996.

The north shore release group, Spring Creek release group, and the Lucky Peak release group were transported in IDFG tankers (3,000-gallon capacity) on June 20, 1996. Loading densities were kept below 0.60 pounds per gallon. Fish were planted at the Lighthouse boat ramp, the Boat Basin boat ramp, and the Trestle Creek boat ramp, in Spring Creek adjacent to Clark Fork Hatchery, and in Lucky Peak Reservoir. The two tankers made three trips on one day to complete the plants.

Rainbow Trout

On May 16, 1996, a total of 1,455,317 Hayspur rainbow trout were transported from Cabinet Gorge Hatchery to the Hagerman Fish Hatchery. The fish averaged 359 fish per pound and had attained a length of 1.91 inches in length. On July 9, 1996, a total of 30,077 Colorado River rainbow trout were tranported and planted into Deer Creek (15,038) and Meadow Creek (15,039). The fish averaged 228 fish per pound and had attained a length of 2.22 inches.

CABGORGE

HATCHERY IMPROVEMENTS

Repairs and Improvements

- OSHA safety materials purchased in 1995 with capital outlay funds continued to be installed during the 1996 season and will be completed in 1997.

- Backyard fencing material purchased in 1995 for residences #1 and #2 will be installed during the summer of 1997. The fencepost holes were completed during the fall of 1996.

- The Jensorter JHC-114 was purchased during the 1996 season.

- The Lotus 2.01 computer software was upgraded to Lotus 3.4A.

- The Residence #1 deck porch was extended, sanded, and resurfaced. The Residence #2 deck porch was sanded and resurfaced.

- Two hatchery picnic tables were prepared for refinishing and will be completed in 1997.

- A new Delta unifence table saw was purchased and assembled.

- A new Landa pressure washer was purchased.

- Pump #5 was repaired by R.C. Worst and reinstalled.

- A new back-up generator (Generac) was delivered and is stored in the new building which was constructed in 1995.

- The Sullivan Springs gravels and log jump structures were replaced during July and August. Funding for the project was acquired from Washington Water Power, Lake Pend Oreille Idaho Club, and one grant.

- New fish release piping was purchased and utilized at the Sullivan Springs trap during the 1996-1997 spawning season.

- New carpeting was installed in Residence #2.

- All department vehicles, tractors, and small engines were serviced regularly and repaired as needed.

– The existing hatchery back-up generator was serviced regularly.

– New batteries were purchased and installed in the 1/2-ton pickup truck.

– The raceways on the north side of the building were painted with Carboline 2-part epoxy paint. The south side will be completed in 1997.

– Concrete repairs were completed on many of the raceways prior to painting. Some additional work still needs to be completed. In addition, all of the cleaning baffle barrel bolt holes had brass inserts installed and were sealed with Carboline paint.

HATCHERY RECOMMENDATIONS

Inadequate amounts of available warm water (50°F) during the production months remains the limiting factor for fish production. Although the upper well field can yield up to 20 cfs, it is too cold during the production cycle. Warmer water from the lower springs must be added to temper the upper well field water. Unfortunately, only 4.4 cfs is available from the lower springs and only a total of 19.4 cfs can be backed up by the generator should a power failure occur.

FISH SPAWNING

Fish Trapping

The Clark Fork River fish trap was in operation from October 15 to the second week of January 1997. The first adult kokanee entered the trap on October 20, and trapping and spawning continued through early January. There were 56 fish trapped. Spawntaking and mortality records indicated 25.00% of the spawning run was female (14).

The Sullivan Springs trap collected 56,057 fish. Of these, 10,464 were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records and mortality records indicated 32.01 % of the spawning run was female.

Spawntaking and Eggs Received

Clark Fork River kokanee spawntaking began on November 26, 1996 and continued to December 18, 1996. Spawntaking activities occurred from November 4, 1996 to January 3, 1997 at the Sullivan Springs fish trap.

A total of 4,051,111 green fertilized kokanee eggs were collected during the 1996-1997 spawning season. Of those, 3,300 (987,650 in 1995) were obtained from 11 female kokanee at Cabinet Gorge Hatchery, and 4,047,811 (11,795,344 in 1995) were obtained from 13,188 female kokanee at the Sullivan Springs trap.

FISH FEED

The fish produced during 1996 were fed a total of 34,312 pounds of feed. All fish feed was acquired from Rangen's, Inc. The overall conversion was 0.99 pounds of feed to produce 1 pound of fish, not including the weight of mortality (Appendix 2).

PUBLIC RELATIONS

Cabinet Gorge Hatchery is recognized by the surrounding communities as the major contributor of kokanee to the Lake Pend Oreille fishery. The importance of this lake fishery to the local economy is presently estimated at over five million dollars. The hatchery has been the focus of many radio, television, and newspaper stories in recent years. With the decline of kokanee numbers in recent years, even more attention is placed on the hatchery. Because of the popularity of the lake and its attractions, tourism is a booming business, and we have people from all over the world visiting the hatchery.

A total of 200 people signed our guest registration book this year. An estimated 700 visitors toured the hatchery during the 1996 season. In addition, tours were given to school groups and other organizations.

CABGORGE

ACKNOWLEDGMENTS

We would like to thank the Cabinet Gorge Dam personnel for their continued cooperation with hatchery operations. Thanks also to the Lake Pend Oreille Idaho Club, Bonner County Sportsmens Association, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season.

Appendix 1. Production summary, all species, 1996.

Species	Number	Pounds	Length	Feed fed	Feed cost	Annual cost	Cost/lb of fish	Cost/1,000 fish	Cost/inch of fish	Conversion
Pend Oreille late kokanee	10,845,304	32,742	2.16	30,132	$19,941.36	$192,216.20	$5.87	$17.72	$0.0082	0.98
Hayspur rainbow trout	1,455,317	4,050	1.91	3,947	$2,612.12	$25,178.46	$6.22	$17.30	$0.0091	1.07
rainbow trout	30,077	132	2.22	233	$154.20	$1,486.34	$11.26	$49.42	$0.0223	1.86
Totals/ Average	12,330,698	36,924	2.13	34,312	$22,707.68	$218,881.00	$5.93	$17.75	$0.0083	0.99

Appendix 2. Lake Pend Oreille kokanee spawntaking summary, 1996.

Spawntaking site	Total fish	Females spawned	Green eggs	Fecundity	Percent females
Sullivan Springs	56,057	13,188	4,047,811	307	32.01%
Cabinet Gorge	56	11	3,300	300	25.00%
Totals/Average	56,113	13,199	4,051,111	307	32.00%
Total fish includes male/female prespawn mortality.					

1996 ANNUAL PERFORMANCE REPORT

State of: Idaho | Program: Fisheries Management F-71-R-21

Project I: Surveys and Inventories | Subproject I-G: Upper Snake Region

Job: b - Henry's Lake | Title: Lowland Lakes Investigations

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

The 1996 spawning operations at Henry's Lake produced 1,584,603 eyed cutthroat trout *Oncorhynchus clarki* eggs, 1,252,724 eyed hybrid trout eggs, and 428,050 eyed brook trout *Salvelinus fontinalis* eggs. Cutthroat trout in the Hatchery Creek run averaged 443 mm, hybrid trout averaged 569 mm, and brook trout averaged 313 mm. Catch composition in six net nights of gillnetting at Henry's Lake was 49.1% cutthroat trout, 41.5% hybrid trout, and 9.4% brook trout.

Pathology reports confirmed the presence of *Myxobolus cerebralis,* the causative agent for whirling disease, in Henry's Lake cutthroat trout. Myxobolus spores were detected in brook trout, but histology was unable to confirm the species.

Authors:

Jeff Dillon
Regional Fishery Biologist

Mark Gamblin
Regional Fishery Manager

METHODS

The fishery management biologist stationed at Henry's Lake Hatchery resigned from IDFG in June 1996 and the position was eliminated. Prior to this, the planned management activities for 1996 included continuing the spawn-taking and run monitoring, eliminating the creel survey for one year, and placing more emphasis on extensive population sampling in the lake. Due to the loss of the biologist position, only limited population survey data were collected. Ashton Hatchery personnel assumed responsibility for cutthroat trout *Oncorhynchus clarki,* hybrid trout, and brook trout *Salve/inus font/nails* spawning operations, fence and screen maintenance, and future creel census work.

Spawning Operation

The Hatchery Creek fish ladder was opened on March 2 and remained in operation until April 9. Fish ascending the ladder were identified as cutthroat or hybrid trout and enumerated. A sub-sample of 10% of each group were measured (Total Length - mm). Hybrid trout were produced with cutthroat trout eggs and Kamloops rainbow trout O. *mykiss* sperm obtained from Ennis Hatchery, Montana. Cutthroat trout males and females were spawned to produce cutthroat trout for supplemental stocking in Henry's Lake and other Idaho fisheries.

On October 3, Ashton Hatchery personnel began a morpholine drip in the Henry's Lake Hatchery spawning facility. From October 8 through November 13 the fish ladder was opened to collect spawning brook trout. Fish entering the trap were sexed, enumerated, and measured. Spawning methods differed from previous years. Gametes were taken and pooled into groups of five at the spawn house. Oxygen was added to bags containing pooled sperm, and both egg and sperm bags were transported in coolers to Ashton Hatchery. At Ashton Hatchery, ovarian fluid samples were taken, the eggs were fertilized, disinfected, enumerated, and placed into Heath stacks for incubation.

Disease samples were taken from both spawning runs. Ovarian fluids were collected from cutthroat trout during spawning at Henry's Lake Hatchery. A mixed-sex group of 60 adult cutthroat trout were also sacrificed for disease testing. All samples were sent to the Eagle Laboratory. Brook trout ovarian fluid samples were obtained at Ashton Hatchery prior to egg fertilization, and 50 adult male brook trout were sacrificed from the spawning ladder.

Gillnetting

On June 5-7, gill net samples were collected from six standardized sampling locations (total six net nights). Nets were set at dusk and retrieved the following morning. Captured fish were identified to species, measured, and weighed.

Water Quality

Late winter (January and February 1997) dissolved oxygen concentrations were assessed at established sampling sites.

RESULTS AND DISCUSSION

Spawning Operation

A total of 5,678 cutthroat trout ascended the spawning ladder between March 2 and April 9, with 3,515 males (Figure 1) and 2,163 females (Figure 2). Hybrid trout totaled 1,665 fish, 978 males (Figure 3) and 687 females (Figure 4). Mean length for male and female cutthroat trout was 439 and 447 mm, respectively (Figure 5). Combined average cutthroat trout length was 443 mm. Hybrid trout males and females averaged 574 and 565 mm, respectively (Figure 6). Combined average hybrid trout length was 569 mm.

Cutthroat trout green eggs totaled 2,211,921 from 976 females for an average fecundity of 2,266 eggs per female. Eyed cutthroat trout eggs totaled 1,584,603 for an overall eye-up rate of 71.6%.

Hybrid trout green eggs totaled 1,945,047 from 762 females for an average fecundity of 2,552 eggs per female. Eyed hybrid trout eggs totaled 1,252,724 for an overall eye-up rate of 64.4%.

From October 8 through November 13, a total of 1,342 brook trout ascended the fish ladder, with 836 males (Figure 7) and 547 females (Figure 8). Male and female brook trout averaged 319 and 306 mm for a combined average of 313 mm.

Brook trout green eggs totaled 533,435 from 384 females for an average fecundity of 1,389 eggs per female. Eyed eggs totaled 428,050 for an overall eye-up rate of 80%.

Cutthroat trout ovarian fluid disease samples showed no viral pathogens, and a low level of potential bacterial pathogens. In the adult cutthroat trout samples, microsporidian spores were detected by the digestion method in 4 of 12 pooled samples. Histology confirmed the spores were in the cartilage, indicating they were *Myxobolus cerebralis*, the causative agent of whirling disease.

No pathogens were detected from brook trout ovarian samples. In adult brook trout samples, *Myxobolus* spores were detected by the digestion method, but histology was unable to confirm the species.

Gillnetting

A total of 53 fish were collected in the six net nights. Catch composition was 49.1 % cutthroat trout, 41.5% hybrid trout, and 9.4% brook trout (Appendix A). No Utah chubs *Gila atraria* were sampled. Cutthroat trout ranged from 200 to 500 mm total length, hybrids 300 to 670 mm, and brook trout, 230 to 420 mm.

Water Quality

Dissolved oxygen data were not compiled in time for inclusion in this report. The data will be presented in a report covering the 1997 field season.

RECOMMENDATIONS

1. Continue annual gill net surveys to evaluate status of Utah chub population.

2. Continue experimental sterile hybrid project.

3. Develop a winter aeration operations manual to provide guidelines for use of aeration system.

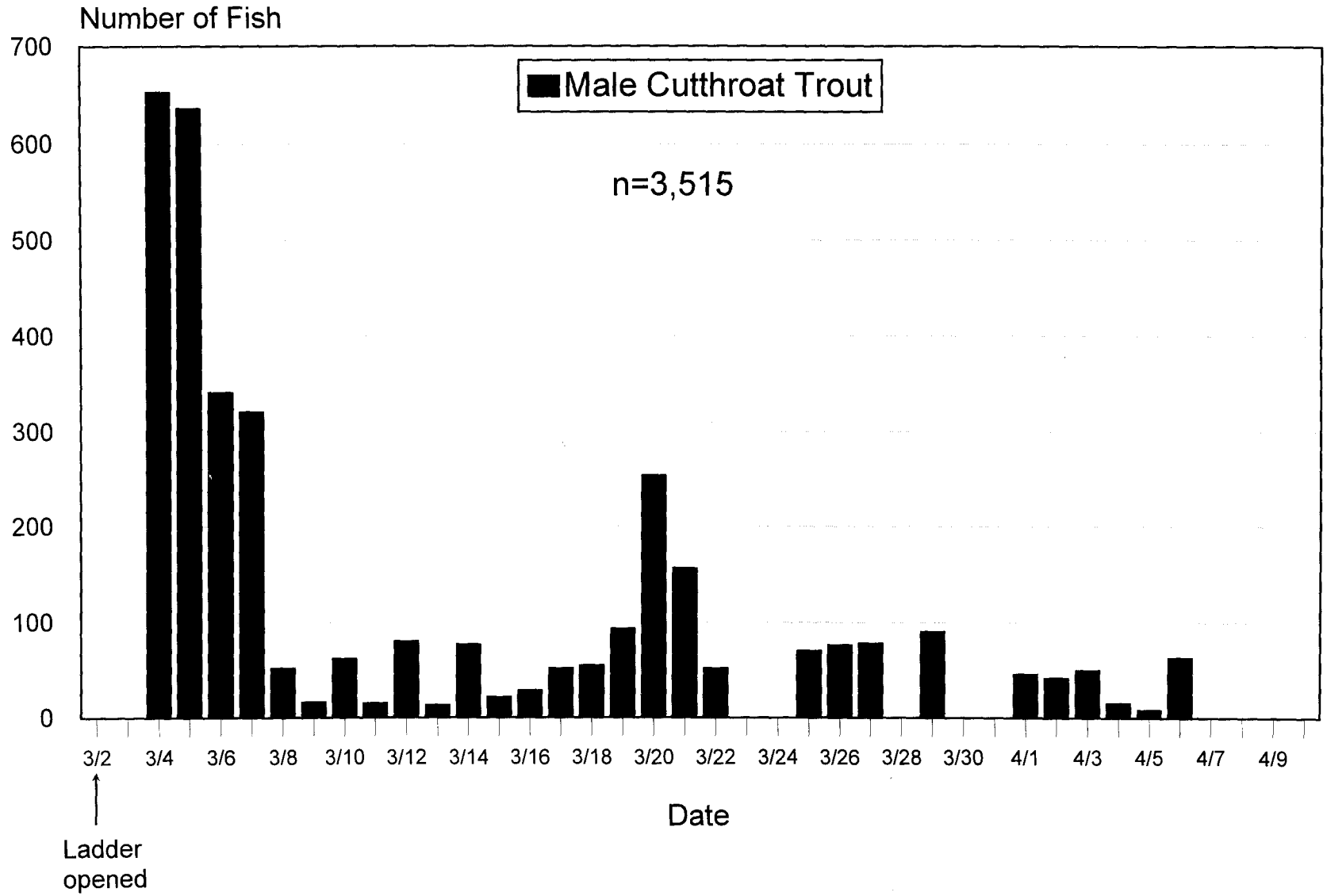

Figure 1. Run timing for male cutthroat trout at Henry's Lake Hatchery, 1996.

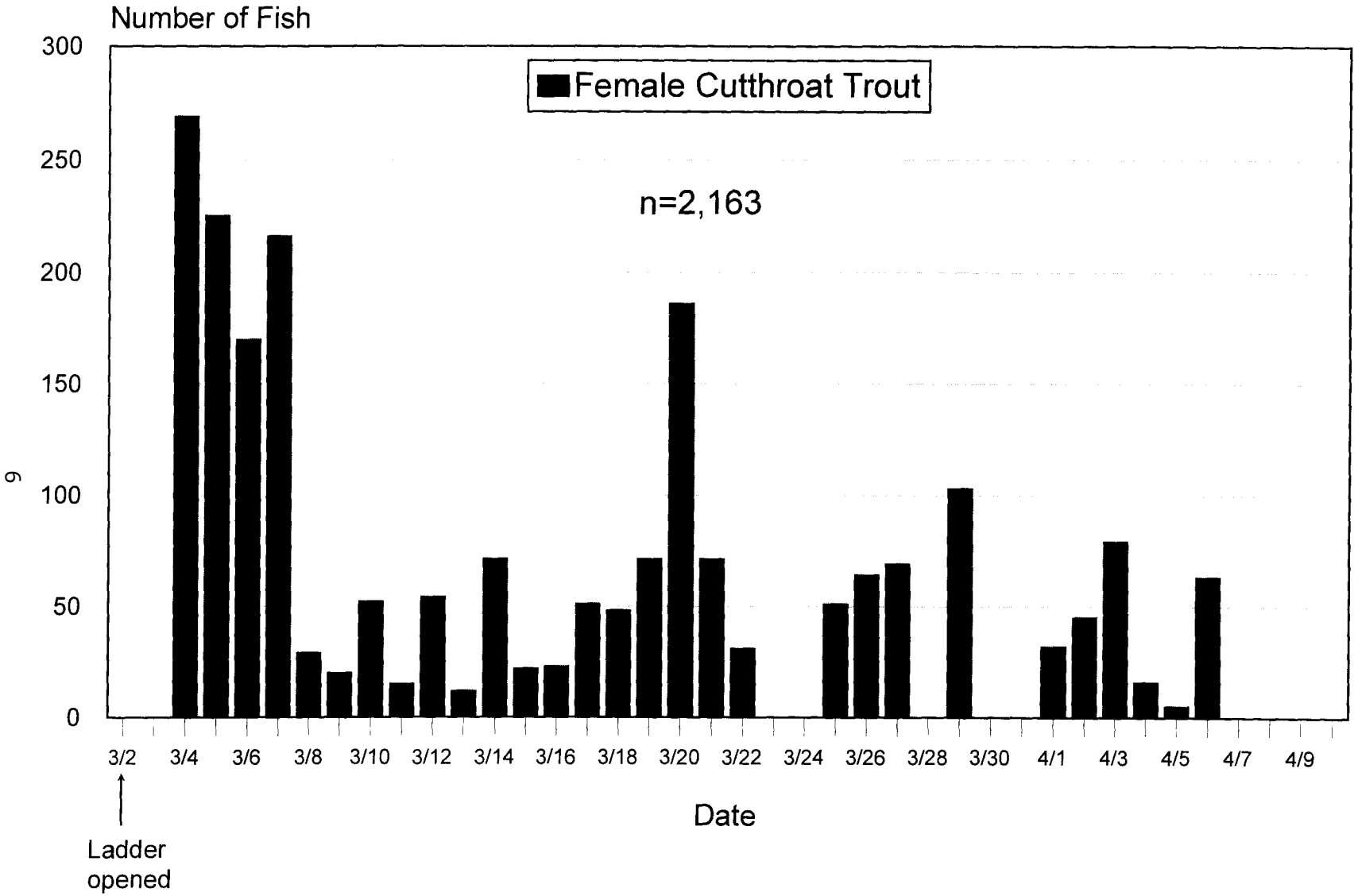

Figure 2. Run timing for female cutthroat trout at Henry's Lake Hatchery, 1996.

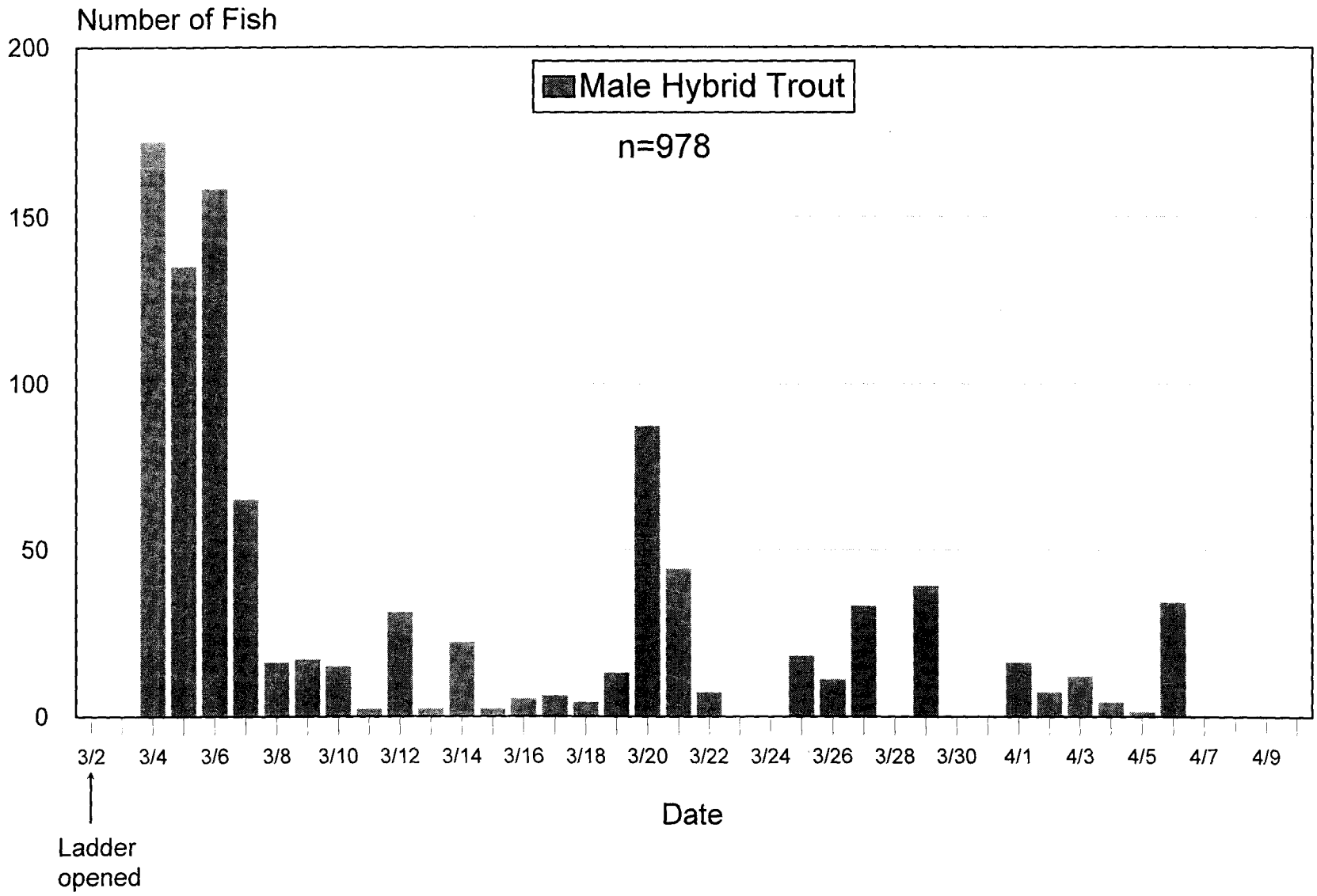

Figure 3. Run timing for male hybrid trout at Henry's Lake Hatchery, 1996.

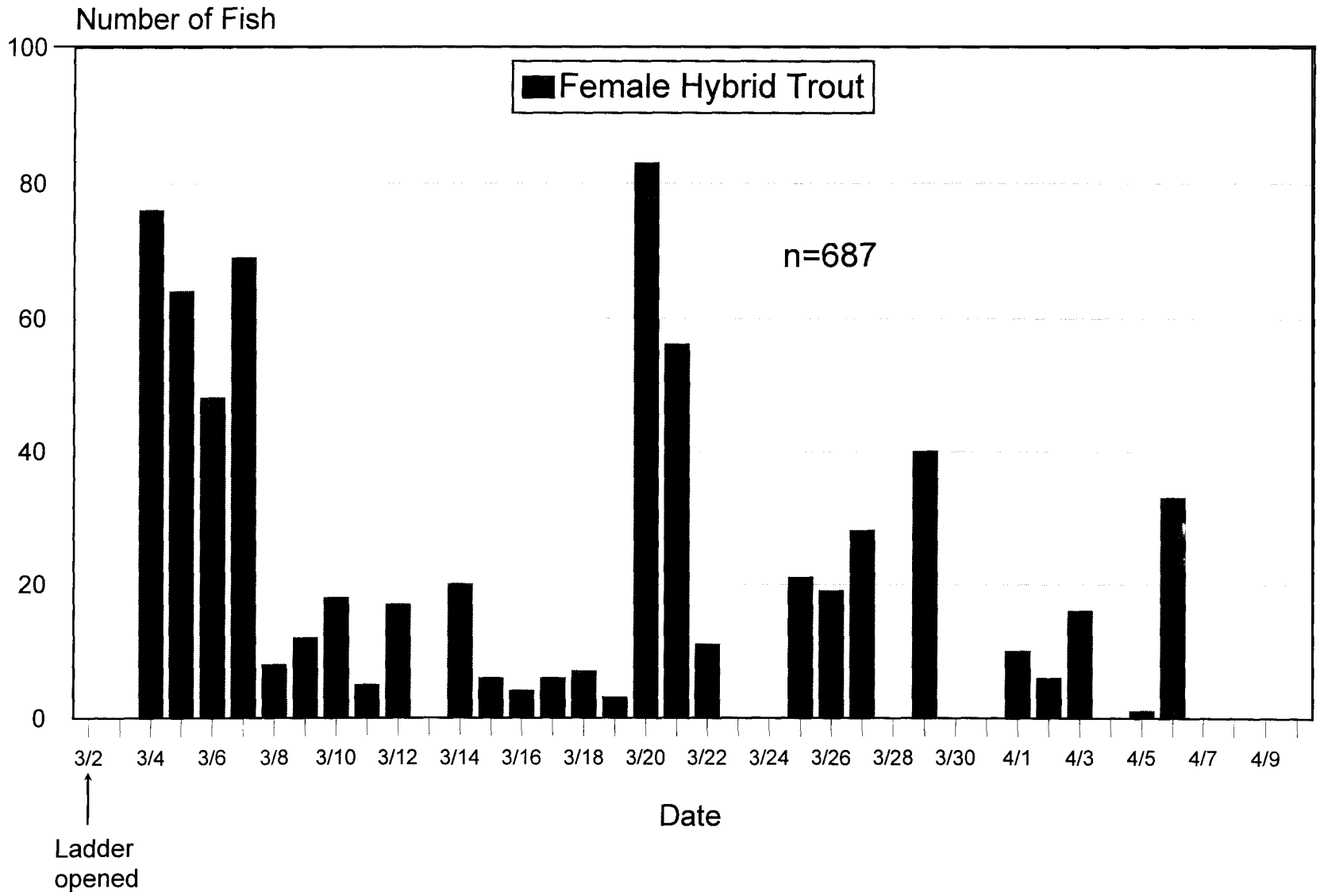

Figure 4. Run timing for female hybrid trout at Henry's Lake Hatchery, 1996.

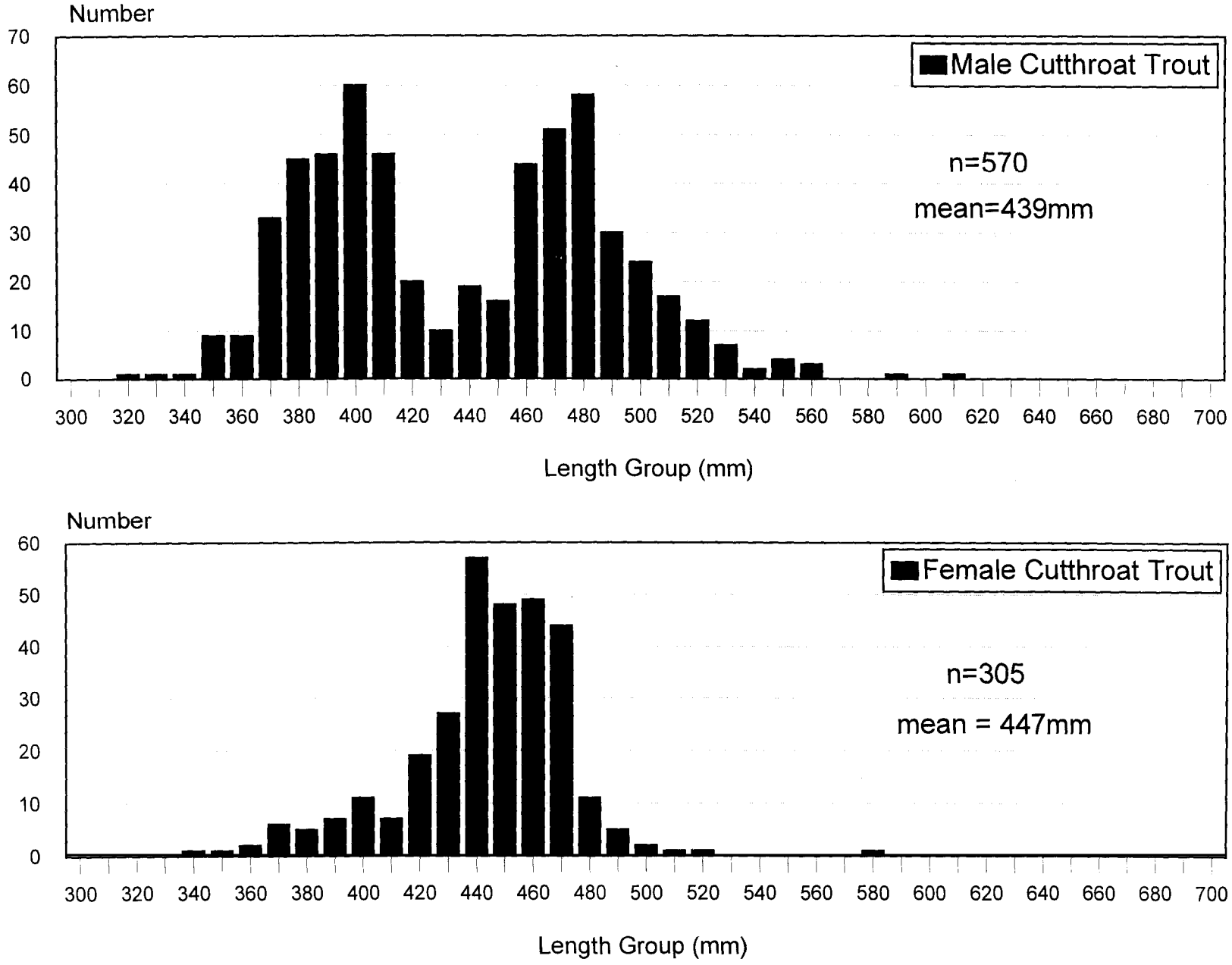

Figure 5. Length frequencies of male and female cutthroat trout in the Henry's Lake Hatchery spawning run, 1996.

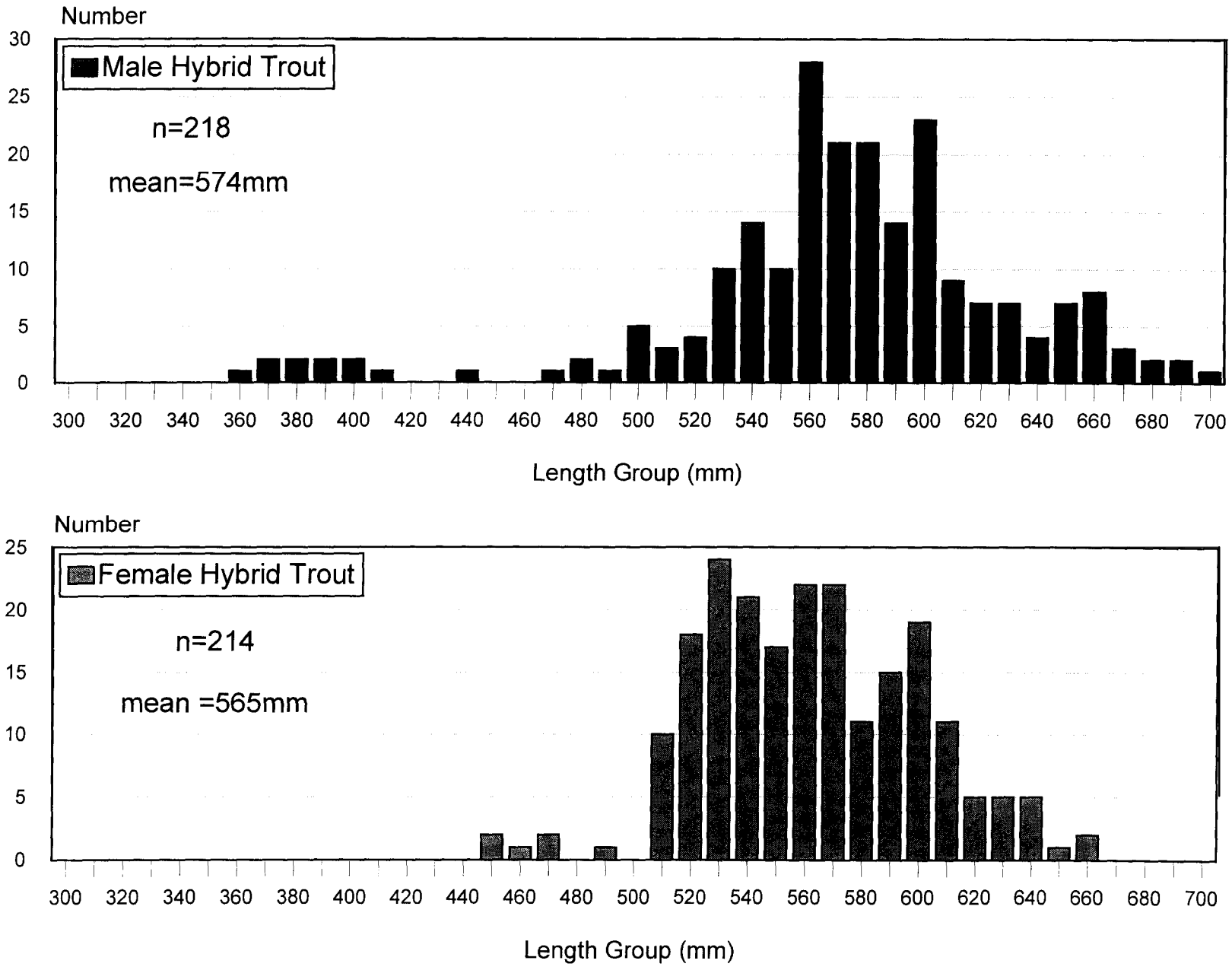

Figure 6. Length frequencies of male and female hybrid trout in the Henry's Lake Hatchery spawning run, 1996.

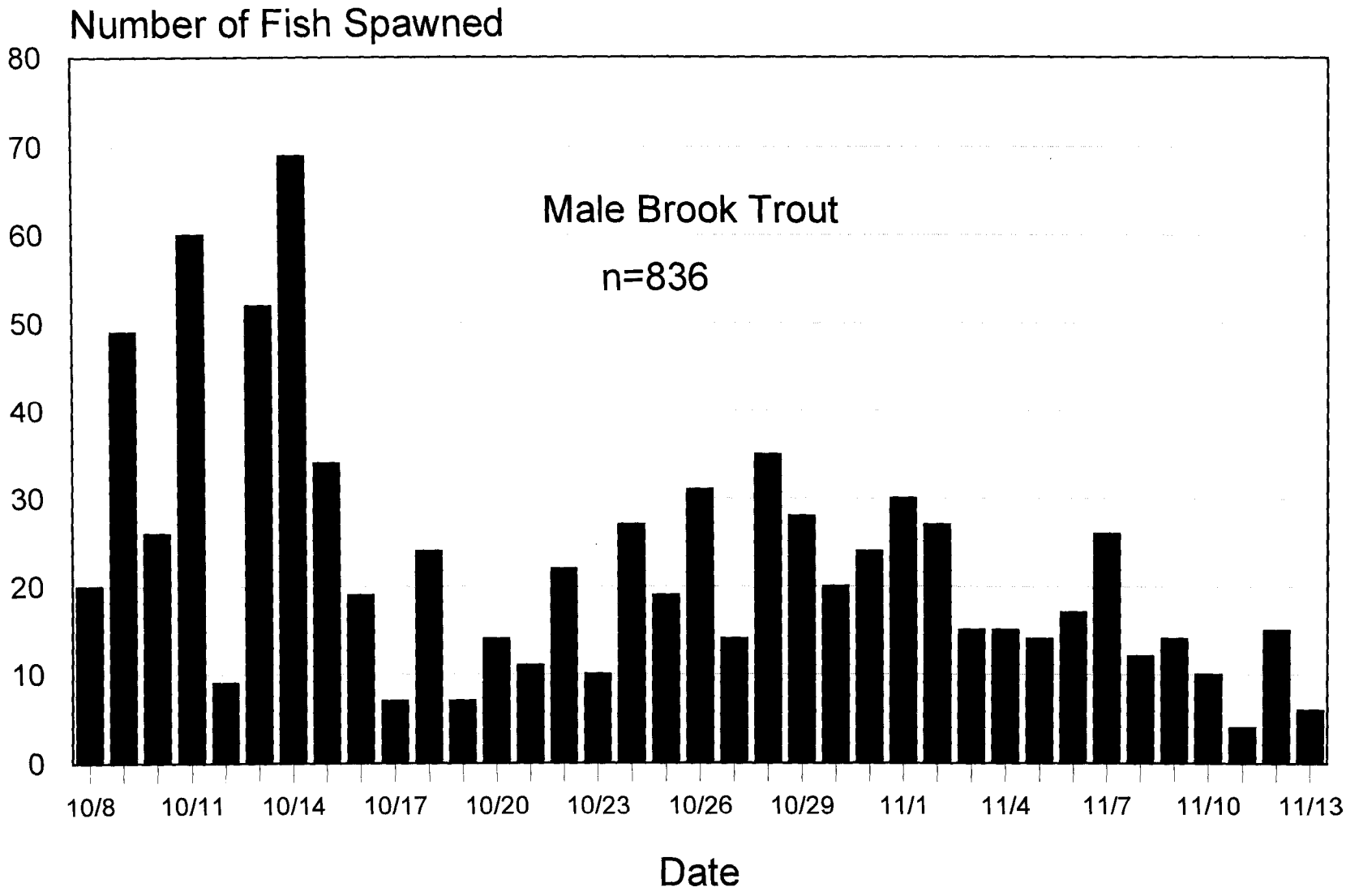

Figure 7. Run timing for male brook trout at Henry's Lake Hatchery, October-November, 1996.

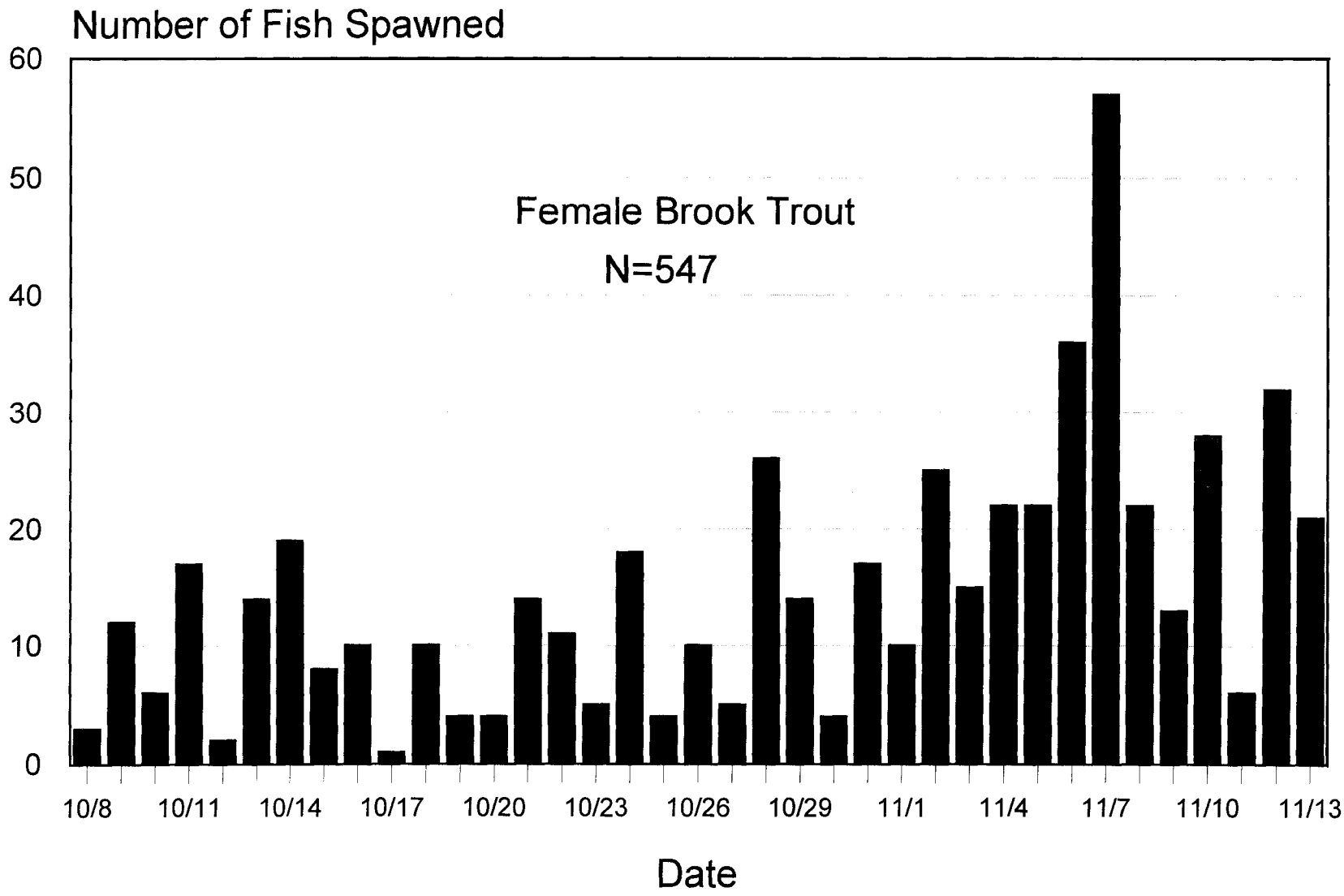

Figure 8. Run timing for female brook trout at Henry's Lake Hatchery, October-November, 1996.

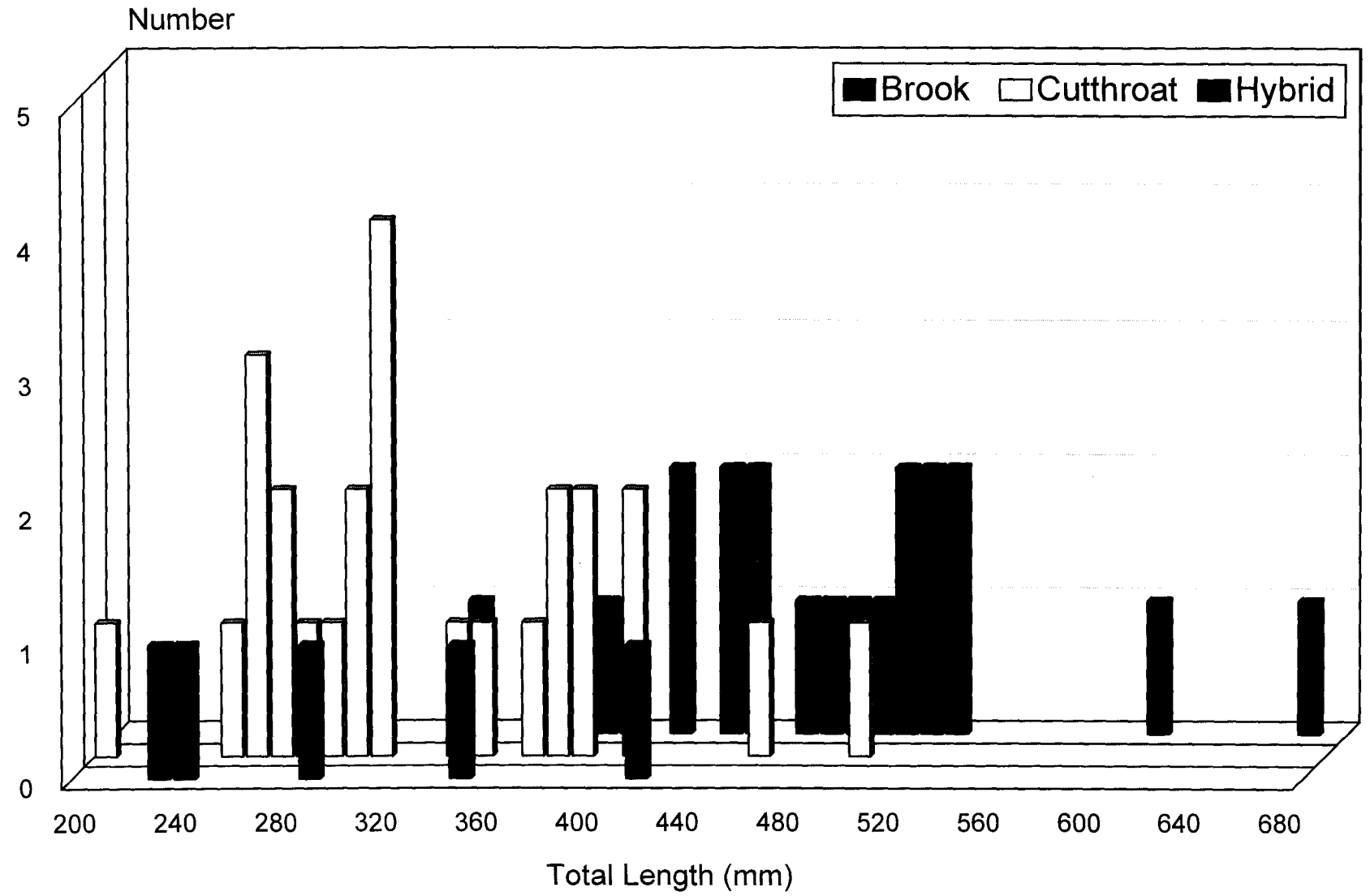

Figure 9. Catch composition and size structure in gillnet samples from Henry's Lake, June 5-7, 1996.

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

MACKAY FISH HATCHERY

1996

Phil Coonts, Fish Hatchery Manager I
Robert Hoover, Assistant Fish Hatchery Manager
Mel Hughes, Fish Culturist

INTRODUCTION

Included in the year's production were 13 lots of fish, comprised of 5 species and 9 different strains.

Rainbow trout *Oncorhynchus mykiss*
- Hayspur (ID) (2 year classes)
- Arlee (Ennis National Fish Hatchery, MT)

Cutthroat trout O. *clarki*
- Westslope (McCall) (2 year classes)
- Henrys Lake

Brown trout *Salmo trutta*
- Plymouth Rock (Saratoga, WY) (2 year classes)
- Crawford (Paint Bank Hatchery, VA)

Rainbow x Cutthroat trout hybrids
- Henrys Lake cutthroat females x Ennis NFH rainbow males

Kokanee salmon O. *nerka kennerlyi*
- Early (Deadwood) (2 year classes)
- October (Roaring Judy Hatchery, CO)

The hatchery also reared 650 Hayspur rainbow trout fingerlings from Nampa Hatchery and 500 Henrys Lake cutthroat trout fingerlings in a five-month whirling disease exposure study. These fish were exposed for different lengths of time in the whirling disease-infected waters of Copper Basin. They were kept in 1-m circular tanks, outside of the hatchery building.

WATER SUPPLY

Water for hatchery production is provided by three collection springs in an artesian area at the hatchery. The area is fenced off and has been dug out, then filled with cobblestone. The water volume available for hatchery production remained consistent with previous years. Flows ranged from 18 to 24 cubic feet per second (cfs). Lowest flows occur during February, while highest flows occur during July. Since the 1983 earthquake, temperatures have varied between the three different springs supplying the hatchery; one at 49°F, one at 51 °F, and one at 54°F. Incubation temperature is 51°F.

HATCHERY IMPROVEMENTS

The 1996 GMC truck tank was modified to allow easier off loading of scattered plants and the tank lids were replaced. The sunshades received new vinyl covers replacing the worn-out canvas. A waste oil station was built to make the storage and transfer of used oil more convenient. Cement parking barriers were installed in place of the old treated timbers.

FUTURE NEEDS

Replacement nursery troughs are needed. The current 35-year-old troughs are wearing through the bottom, despite patching, allowing leakage into the hollow interior of the double wall construction. Residence #3 needs the old wood siding replaced. Residence #3 also needs a garage built to bring that house up to standard with the other two residences.

FISH STOCKED

Fingerlings of various species and strains were stocked in six regions of Idaho (Appendix 1). These put-grow-and-take fish numbered 3,440,600 fish weighing 38,800 lbs.

Catchable rainbow trout (8 inches +) were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 115,280 and weighed 76,028 pounds. Catchable brown trout, numbering 5,750 fish and weighing 2,875 lbs, were planted into Horsethief Reservoir.

The hatchery also reared 11,375 cutthroat and 756 rainbow fry for planting into ten high mountain lakes in the Upper Snake Region. Motorcycles, 4-wheelers, stock, and foot travel was used to plant these fish.

The fish transport trucks assigned to Mackay Hatchery traveled on 139 fish stocking trips during the year, logging 25,000 miles. Transport tankers assigned to Fish Transportation hauled nine loads of fish for the hatchery during the year.

Ririe Reservoir received 15,100 of the "Mackay Magnums," ranging in size from 14 to 16 inches long. These fish had their right-ventral fin clipped to distinguish them from Hagerman Fish Hatchery catchables in a creel-return study. Robert's Gravel Pond, located in Upper Snake Region, also received 1,020 of these fish.

FISH FEED

Fish feed used during the year totalled 93,100 pounds at a cost of $36,424. Feed conversion averaged 1.06 pounds of feed for every pound of fish produced. Feed cost per pound of fish produced was $0.416. Feed cost per inch of fish produced was $0.0037.

BioDiet, BioDry 1000, Nelson's Sterling Silver Cup dry and Soft-Moist trout and salmon diets, and Rangen's feed were used, depending upon the specifications of the feed contract.

PUBLIC RELATIONS

Approximately 800 people toured the hatchery during the year. The hatchery's remote location does not seem to attract large crowds of people. Most visitors come to fish in the diversion pond below the hatchery. Scheduled tours were given to five groups. The hatchery crew and the local conservation officer participate in Idaho's "Adopt a Highway" litter control program. Six miles of Highway 93 along Mackay Reservoir are cleaned biannually. Assistance was also provided for the Hunter Education Program at Mackay School.

FISH FIN CONDITION

Using the "Ashton Method" for measuring fin condition of production fish raised at Mackay Hatchery, measurements were taken several times during the planting season.

Fins measured 70% of wild fish fins for Hayspur rainbow trout catchables. The brown trout catchables measured 68%. Fingerling fish fins measured 76% of wild fins for early kokanee, 77% for late kokanee, 93% of wild fins for brown trout, 82% for cutthroat/rainbow hybrids, and 74% of wild fins for Henrys Lake cutthroat trout. The westslope cutthroat trout reared for Payette Lake net pens mesured 65% of wild fins.

FISH MARKING

Ten percent (96,900) of the Henrys Lake cutthroat trout were adipose fin-clipped prior to stocking. Twelve percent (100,500) of the cutthroat/rainbow hybrids planted into Island Park Reservoir had their adipose fin clipped off.

ACKNOWLEDGEMENTS

During 1996, the Mackay Hatchery crew included, at different times, Jason Rheinhardt, Rick Bohling, and Mike Paddock; Biological- Aides. Without their excellent assistance, much of the work mentioned above would not have been done. Their care and concern enable the hatchery to produce the quality of fish we do. Mel Hughes, Fish Culturist, Mick Hoover, Assistant Hatchery Manager, and Phil Coonts, Hatchery Manager, round out the hatchery's personnel. Manpower expended totalled 36 permanent man-months and 13.5 temporary man-months.

Appendix 1. Fish production at Mackay Fish Hatchery, Janua y 1 to December 31, 1995.

Species/ Strain	Lot number	Source	Received as	Number/lbs received or carried over	Yield (number/lb)	Destination/ comments
Hayspur rainbow	4-U-Id-R9	Hayspur	eyed eggs	109,000/	102,100/	1996 catchables
trout				28,250	46,000	
Hayspur rainbow	5-U-Id-R9	Hayspur	eyed eggs	131,600/	128,800/	1997 catchables
trout				360	25,600	1996 fingerlings
Arlee rainbow trout	6-En-RA	Ennis NFH,	eyed eggs	185,000/	150,000/	1998 catchables
		Montana		eyed eggs	alevins	
westslope	5-U-Id-C2	McCall	fry	22,100/	18,765/	1996 Payette
cutthroat trout				121	1,350	Lake net pen
westslope	6-U-Id-C2	McCall	fry	26,300/	24,950/	1997 Payette
cutthroat trout				39	268	Lake
Henrys Lake	6-U-Id-C3	Henrys Lake	eyed eggs	1,400,000/	1,044,500/	Henrys Lake,
westslope				eyed eggs	6,300	Salmon Region,
cutthroat trout						high mountain
						lake plants
Plymouth Rock	4-Sr-BN	Saratoga NFH,	eyed eggs	5,900/	5,750/	1996 Horsethief
brown trout		Wyoming		1,200	2,900	Reservoir
						catchables
Plymouth Rock	5-Sr-BN	Saratoga NFH,	eyed eggs	5,500/	5,283/	1997 Horsefhief
brown trout		Wyoming		alevins	1,000	Reservoir
						catchables
Plymouth Rock	5-Sr-BN	Saratoga NFH,	eyed eggs	340,000/	300,100/	1996 fingerlings
brown trout		Wyoming		eyed eggs	5,300	Magic Valley and
						Upper Snake regions
Plymouth Rock	6-Sr-BN	Saratoga NFH,	eyed eggs	190,000/	160,000/	1997 fingerlings
brown trout		Wyoming		eyed eggs	alevins	
Crawford brown	6-Pb-BN	Paint Bank SFH,	eyed eggs	125,000/	115,000/	1997 fingerlings
trout		Virginia		eyed eggs	alevins	
Deadwood kokanee	5-U-Id-KE	Deadwood	green eggs	1,718,000/	1,013,000/	1996 fingerlings
		Reservoir		green eggs	17,000	
Deadwood kokanee	6-U-Id-KE	Deadwood	green eggs	70,000/	35,000/	1997 Deadwood
		Reservoir		green eggs	alevins	Reservoir
Blue Mesa kokanee	5-U-Co-KO	Roaring Judy,	eyed eggs	349,000/	252,000/	1996 Salmon
		Colorado		eyed eggs	3,000	Falls Reservoir
Blue Mesa kokanee	6-U-Id-KO	Roaring Judy,	eyed eggs	1,338,000/	Not all	1997 fingerlings
		Colorado		eyed eggs	hatched yet.	

Submitted by:

Cabinet Gorge Fish Hatchery

Henry's Lake Fish Hatchery

Mackay Fish Hatchery

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Al Van Vooren, Fishery Research Manager
and Acting Chief of Fisheries

Funds Expended:

State:	$92,398.94
Federal:	$277,196.81
Total:	$369,595.75